

<110> PROFOS AG

<120> Verfahren zum Nachweis von Endotoxin

<130> PRO-013 PCT

<140> unknown

<141> 2004-12-20

<150> DE 103 60 844.3

<151> 2003-12-20

<160> 15

<170> PatentIn version 3.1

<210> 1

<211> 78

<212> DNA

<213> artificial sequence

<220>

<223> primer

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gaaggaacta gtcatatggc tagctggagc caccgcagc tcgaaaaagg cgccagtaat 60

aatacatatc aacacgtt 78

<210> 2

<211> 54

<212> DNA

<213> artificial sequence

<220>

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acgcgcaaag cttgtcgagc gatcctatca ttcttttacc ttaattatgt agtt 54

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<212> DNA

<213> artificial sequence

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<223> primer

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aatacatatc aacacgtt 78

<210> 4

<211> 78

<212> DNA

<213> artificial sequence

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gaaggaacta gtcatatggc tagctggagc caccgcagc tcgaaaaagg cgctgtaat 60
aatacatatc aacacgtt 78

<210> 5

<211> 19

<212> PRT

<213> artificial sequence

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<223> strep tag

<400> 5

Met Ala Ser Trp Ser His Pro Gln Phe Glu Lys Gly Ala Ser Asn Asn
1 5 10 15

Thr Tyr Gln

<210> 6

<211> 19

<212> PRT

<213> artificial sequence

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<223> strep tag

<400> 6

Met Ala Cys Trp Ser His Pro Gln Phe Glu Lys Gly Ala Ser Asn Asn
1 5 10 15

Thr Tyr Gln

<210> 7

<211> 19

<212> PRT

<213> artificial sequence

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<223> strep tag

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Met Ala Ser Trp Ser His Pro Gln Phe Glu Lys Gly Ala Cys Asn Asn
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Thr Tyr Gln

<210> 8

<211> 539

<212> PRT

<213> artificial sequence

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<223> T4p12 with strep tag

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Met Ala Ser Trp Ser His Pro Gln Phe Glu Lys Gly Ala Ser Asn Asn
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Thr Tyr Gln His Val Ser Asn Glu Ser Arg Tyr Val Lys Phe Asp Pro
          20          25          30

Thr Asp Thr Asn Phe Pro Pro Glu Ile Thr Asp Val Gln Ala Ala Ile
          35          40          45

Ala Ala Ile Ser Pro Ala Gly Val Asn Gly Val Pro Asp Ala Ser Ser
          50          55          60

Thr Thr Lys Gly Ile Leu Phe Leu Ala Thr Glu Gln Glu Val Ile Asp
65          70          75          80

Gly Thr Asn Asn Thr Lys Ala Val Thr Pro Ala Thr Leu Ala Thr Arg
          85          90          95

Leu Ser Tyr Pro Asn Ala Thr Glu Ala Val Tyr Gly Leu Thr Arg Tyr
          100          105          110

Ser Thr Asp Asp Glu Ala Ile Ala Gly Val Asn Asn Glu Ser Ser Ile
          115          120          125

Thr Pro Ala Lys Phe Thr Val Ala Leu Asn Asn Val Phe Glu Thr Arg
          130          135          140

Val Ser Thr Glu Ser Ser Asn Gly Val Ile Lys Ile Ser Ser Leu Pro
145          150          155          160

Gln Ala Leu Ala Gly Ala Asp Asp Thr Thr Ala Met Thr Pro Leu Lys
          165          170          175

Thr Gln Gln Leu Ala Val Lys Leu Ile Ala Gln Ile Ala Pro Ser Lys
          180          185          190

Asn Ala Ala Thr Glu Ser Glu Gln Gly Val Ile Gln Leu Ala Thr Val
          195          200          205

Ala Gln Ala Arg Gln Gly Thr Leu Arg Glu Gly Tyr Ala Ile Ser Pro
          210          215          220

Tyr Thr Phe Met Asn Ser Thr Ala Thr Glu Glu Tyr Lys Gly Val Ile
225          230          235          240

Lys Leu Gly Thr Gln Ser Glu Val Asn Ser Asn Asn Ala Ser Val Ala
          245          250          255

Val Thr Gly Ala Thr Leu Asn Gly Arg Gly Ser Thr Thr Ser Met Arg
          260          265          270

Gly Val Val Lys Leu Thr Thr Thr Ala Gly Ser Gln Ser Gly Gly Asp
          275          280          285

Ala Ser Ser Ala Leu Ala Trp Asn Ala Asp Val Ile His Gln Arg Gly
          290          295          300

Gly Gln Thr Ile Asn Gly Thr Leu Arg Ile Asn Asn Thr Leu Thr Ile
305          310          315          320

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Ala Ser Gly Gly Ala Asn Ile Thr Gly Thr Val Asn Met Thr Gly Gly
 325 330 335

Tyr Ile Gln Gly Lys Arg Val Val Thr Gln Asn Glu Ile Asp Arg Thr
 340 345 350

Ile Pro Val Gly Ala Ile Met Met Trp Ala Ala Asp Ser Leu Pro Ser
 355 360 365

Asp Ala Trp Arg Phe Cys His Gly Gly Thr Val Ser Ala Ser Asp Cys
 370 375 380

Pro Leu Tyr Ala Ser Arg Ile Gly Thr Arg Tyr Gly Gly Ser Ser Ser
 385 390 395 400

Asn Pro Gly Leu Pro Asp Met Arg Gly Leu Phe Val Arg Gly Ser Gly
 405 410 415

Arg Gly Ser His Leu Thr Asn Pro Asn Val Asn Gly Asn Asp Gln Phe
 420 425 430

Gly Lys Pro Arg Leu Gly Val Gly Cys Thr Gly Gly Tyr Val Gly Glu
 435 440 445

Val Gln Lys Gln Gln Met Ser Tyr His Lys His Ala Gly Gly Phe Gly
 450 455 460

Glu Tyr Asp Asp Ser Gly Ala Phe Gly Asn Thr Arg Arg Ser Asn Phe
 465 470 475 480

Val Gly Thr Arg Lys Gly Leu Asp Trp Asp Asn Arg Ser Tyr Phe Thr
 485 490 495

Asn Asp Gly Tyr Glu Ile Asp Pro Ala Ser Gln Arg Asn Ser Arg Tyr
 500 505 510

Thr Leu Asn Arg Pro Glu Leu Ile Gly Asn Glu Thr Arg Pro Trp Asn
 515 520 525

Ile Ser Leu Asn Tyr Ile Ile Lys Val Lys Glu
 530 535

<210> 9

<211> 527

<212> PRT

<213> protein p12 of T2 phage

<400> 9

Met Ser Asn Asn Thr Tyr Gln His Val Ser Asn Glu Ser Arg Tyr Val
 1 5 10 15

Lys Phe Asp Pro Thr Asp Thr Asn Phe Pro Pro Glu Ile Thr Asp Val
 20 25 30

Gln Ala Ala Ile Ala Ala Ile Ser Pro Ala Gly Val Asn Gly Val Pro
 35 40 45

Asp Ala Ser Ser Thr Thr Lys Gly Ile Leu Phe Leu Ala Thr Glu Gln
 50 55 60

Glu Val Ile Asp Gly Thr Asn Asn Thr Lys Ala Val Thr Pro Ala Thr

65

70

75

80

Leu	Ala	Thr	Arg	Leu	Ser	Tyr	Pro	Asn	Ala	Thr	Glu	Ala	Val	Tyr	Gly	85	90	95
Leu	Thr	Arg	Tyr	Ser	Thr	Asp	Asp	Glu	Ala	Ile	Ala	Gly	Val	Asn	Asn	100	105	110
Glu	Ser	Ser	Ile	Thr	Pro	Ala	Lys	Phe	Thr	Val	Ala	Leu	Asn	Asn	Val	115	120	125
Phe	Glu	Thr	Arg	Val	Ser	Thr	Glu	Ser	Ser	Asn	Gly	Val	Ile	Lys	Ile	130	135	140
Ser	Ser	Leu	Pro	Gln	Ala	Leu	Ala	Gly	Ala	Asp	Asp	Thr	Thr	Ala	Met	145	150	155
Thr	Pro	Leu	Lys	Thr	Gln	Gln	Leu	Ala	Val	Lys	Leu	Ile	Ala	Gln	Ile	165	170	175
Ala	Pro	Ser	Lys	Asn	Ala	Ala	Thr	Glu	Ser	Glu	Gln	Gly	Val	Ile	Gln	180	185	190
Leu	Ala	Thr	Val	Ala	Gln	Ala	Arg	Gln	Gly	Thr	Leu	Arg	Glu	Gly	Tyr	195	200	205
Ala	Ile	Ser	Pro	Tyr	Thr	Phe	Met	Asn	Ser	Thr	Ala	Thr	Glu	Glu	Tyr	210	215	220
Lys	Gly	Val	Ile	Lys	Leu	Gly	Thr	Gln	Ser	Glu	Val	Asn	Ser	Asn	Asn	225	230	235
Ala	Ser	Val	Ala	Val	Thr	Gly	Ala	Thr	Leu	Asn	Gly	Arg	Gly	Ser	Thr	245	250	255
Thr	Ser	Met	Arg	Gly	Val	Val	Lys	Leu	Thr	Thr	Thr	Ala	Gly	Ser	Gln	260	265	270
Ser	Gly	Gly	Asp	Ala	Ser	Ser	Ala	Leu	Ala	Trp	Asn	Ala	Asp	Val	Ile	275	280	285
His	Gln	Arg	Gly	Gly	Gln	Thr	Ile	Asn	Gly	Thr	Leu	Arg	Ile	Asn	Asn	290	295	300
Thr	Leu	Thr	Ile	Ala	Ser	Gly	Gly	Ala	Asn	Ile	Thr	Gly	Thr	Val	Asn	305	310	315
Met	Thr	Gly	Gly	Tyr	Ile	Gln	Gly	Lys	Arg	Val	Val	Thr	Gln	Asn	Glu	325	330	335
Ile	Asp	Arg	Thr	Ile	Pro	Val	Gly	Ala	Ile	Met	Met	Trp	Ala	Ala	Asp	340	345	350
Ser	Leu	Pro	Ser	Asp	Ala	Trp	Arg	Phe	Cys	His	Gly	Gly	Thr	Val	Ser	355	360	365
Ala	Ser	Asp	Cys	Pro	Leu	Tyr	Ala	Ser	Arg	Ile	Gly	Thr	Arg	Tyr	Gly	370	375	380
Gly	Thr	Ser	Ser	Asn	Pro	Gly	Leu	Pro	Asp	Met	Arg	Gly	Leu	Phe	Val	385	390	395
Arg	Gly	Ser	Gly	Arg	Gly	Ser	His	Leu	Thr	Asn	Pro	Asn	Val	Asn	Gly	405	410	415

Asn Asp Gln Phe Gly Lys Pro Arg Leu Gly Val Gly Cys Thr Gly Gly
 420 425 430
 Tyr Val Gly Glu Val Gln Lys Gln Gln Met Ser Tyr His Lys His Ala
 435 440 445
 Gly Gly Phe Gly Glu Tyr Asp Asp Ser Gly Ala Phe Gly Asn Thr Arg
 450 455 460
 Arg Ser Asn Phe Val Gly Thr Arg Lys Gly Leu Asp Trp Asp Asn Arg
 465 470 475 480
 Ser Tyr Phe Thr Asn Asp Gly Tyr Glu Ile Asp Pro Ala Ser Gln Arg
 485 490 495
 Asn Ser Arg Tyr Thr Leu Asn Arg Pro Glu Leu Ile Gly Asn Glu Thr
 500 505 510
 Arg Pro Trp Asn Ile Ser Leu Asn Tyr Ile Ile Lys Val Lys Glu
 515 520 525

<210> 10
 <211> 527
 <212> PRT
 <213> protein p12 of T4 phage

<400> 10

Met Ser Asn Asn Thr Tyr Gln His Val Ser Asn Glu Ser Arg Tyr Val
 1 5 10 15
 Lys Phe Asp Pro Thr Asp Thr Asn Phe Pro Pro Glu Ile Thr Asp Val
 20 25 30
 His Ala Ala Ile Ala Ala Ile Ser Pro Ala Gly Val Asn Gly Val Pro
 35 40 45
 Asp Ala Ser Ser Thr Thr Lys Gly Ile Leu Phe Ile Pro Thr Glu Gln
 50 55 60
 Glu Val Ile Asp Gly Thr Asn Asn Thr Lys Ala Val Thr Pro Ala Thr
 65 70 75 80
 Leu Ala Thr Arg Leu Ser Tyr Pro Asn Ala Thr Glu Thr Val Tyr Gly
 85 90 95
 Leu Thr Arg Tyr Ser Thr Asn Asp Glu Ala Ile Ala Gly Val Asn Asn
 100 105 110
 Glu Ser Ser Ile Thr Pro Ala Lys Phe Thr Val Ala Leu Asn Asn Ala
 115 120 125
 Phe Glu Thr Arg Val Ser Thr Glu Ser Ser Asn Gly Val Ile Lys Ile
 130 135 140
 Ser Ser Leu Pro Gln Ala Leu Ala Gly Ala Asp Asp Thr Thr Ala Met
 145 150 155 160
 Thr Pro Leu Lys Thr Gln Gln Leu Ala Ile Lys Leu Ile Ala Gln Ile
 165 170 175
 Ala Pro Ser Glu Thr Thr Ala Thr Glu Ser Asp Gln Gly Val Val Gln

180					185					190					
Leu	Ala	Thr	Val	Ala	Gln	Val	Arg	Gln	Gly	Thr	Leu	Arg	Glu	Gly	Tyr
	195						200					205			
Ala	Ile	Ser	Pro	Tyr	Thr	Phe	Met	Asn	Ser	Ser	Ser	Thr	Glu	Glu	Tyr
	210					215					220				
Lys	Gly	Val	Ile	Lys	Leu	Gly	Thr	Gln	Ser	Glu	Val	Asn	Ser	Asn	Asn
225					230					235					240
Ala	Ser	Val	Ala	Val	Thr	Gly	Ala	Thr	Leu	Asn	Gly	Arg	Gly	Ser	Thr
			245						250					255	
Thr	Ser	Met	Arg	Gly	Val	Val	Lys	Leu	Thr	Thr	Thr	Ala	Gly	Ser	Gln
			260					265					270		
Ser	Gly	Gly	Asp	Ala	Ser	Ser	Ala	Leu	Ala	Trp	Asn	Ala	Asp	Val	Ile
	275						280					285			
Gln	Gln	Arg	Gly	Gly	Gln	Ile	Ile	Tyr	Gly	Thr	Leu	Arg	Ile	Glu	Asp
	290					295					300				
Thr	Phe	Thr	Ile	Ala	Asn	Gly	Gly	Ala	Asn	Ile	Thr	Gly	Thr	Val	Arg
305					310					315					320
Met	Thr	Gly	Gly	Tyr	Ile	Gln	Gly	Asn	Arg	Ile	Val	Thr	Gln	Asn	Glu
				325					330					335	
Ile	Asp	Arg	Thr	Ile	Pro	Val	Gly	Ala	Ile	Met	Met	Trp	Ala	Ala	Asp
			340					345					350		
Ser	Leu	Pro	Ser	Asp	Ala	Trp	Arg	Phe	Cys	His	Gly	Gly	Thr	Val	Ser
	355						360					365			
Ala	Ser	Asp	Cys	Pro	Leu	Tyr	Ala	Ser	Arg	Ile	Gly	Thr	Arg	Tyr	Gly
	370					375					380				
Gly	Asn	Pro	Ser	Asn	Pro	Gly	Leu	Pro	Asp	Met	Arg	Gly	Leu	Phe	Val
385					390					395					400
Arg	Gly	Ser	Gly	Arg	Gly	Ser	His	Leu	Thr	Asn	Pro	Asn	Val	Asn	Gly
				405					410					415	
Asn	Asp	Gln	Phe	Gly	Lys	Pro	Arg	Leu	Gly	Val	Gly	Cys	Thr	Gly	Gly
		420						425					430		
Tyr	Val	Gly	Glu	Val	Gln	Ile	Gln	Gln	Met	Ser	Tyr	His	Lys	His	Ala
	435						440					445			
Gly	Gly	Phe	Gly	Glu	His	Asp	Asp	Leu	Gly	Ala	Phe	Gly	Asn	Thr	Arg
	450					455					460				
Arg	Ser	Asn	Phe	Val	Gly	Thr	Arg	Lys	Gly	Leu	Asp	Trp	Asp	Asn	Arg
465					470					475					480
Ser	Tyr	Phe	Thr	Asn	Asp	Gly	Tyr	Glu	Ile	Asp	Pro	Glu	Ser	Gln	Arg
				485					490					495	
Asn	Ser	Lys	Tyr	Thr	Leu	Asn	Arg	Pro	Glu	Leu	Ile	Gly	Asn	Glu	Thr
		500						505					510		
Arg	Pro	Trp	Asn	Ile	Ser	Leu	Asn	Tyr	Ile	Ile	Lys	Val	Lys	Glu	
	515						520					525			

<210> 11
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 <212> PRT
 <213> protein p12 of PP01 phage

<400> 11

Met	Ser	Asn	Asn	Thr	Tyr	Gln	His	Val	Ser	Asn	Glu	Ser	Lys	Tyr	Val	1	5	10	15
Lys	Phe	Asp	Pro	Val	Gly	Ser	Asn	Phe	Pro	Asp	Thr	Val	Thr	Thr	Val	20	25	30	
Gln	Ser	Ala	Leu	Ser	Lys	Ile	Ser	Asn	Ile	Gly	Val	Asn	Gly	Ile	Pro	35	40	45	
Asp	Ala	Ser	Met	Glu	Val	Lys	Gly	Ile	Ala	Met	Ile	Ala	Ser	Glu	Gln	50	55	60	
Glu	Val	Leu	Asp	Gly	Thr	Asn	Asn	Ser	Lys	Ile	Val	Thr	Pro	Ala	Thr	65	70	75	80
Leu	Ala	Thr	Arg	Leu	Leu	Tyr	Pro	Asn	Ala	Thr	Glu	Thr	Lys	Tyr	Gly	85	90	95	
Leu	Thr	Arg	Tyr	Ser	Thr	Asn	Glu	Glu	Thr	Leu	Glu	Gly	Ser	Asp	Asn	100	105	110	
Asn	Ser	Ser	Ile	Thr	Pro	Gln	Lys	Leu	Lys	Tyr	His	Thr	Asp	Asp	Val	115	120	125	
Phe	Gln	Asn	Arg	Tyr	Ser	Ser	Glu	Ser	Ser	Asn	Gly	Val	Ile	Lys	Ile	130	135	140	
Ser	Ser	Thr	Pro	Ala	Ala	Leu	Ala	Gly	Val	Asp	Asp	Thr	Thr	Ala	Met	145	150	155	160
Thr	Pro	Leu	Lys	Thr	Gln	Lys	Leu	Ala	Ile	Lys	Leu	Ile	Ser	Gln	Ile	165	170	175	
Ala	Pro	Ser	Glu	Asp	Thr	Ala	Ser	Glu	Ser	Val	Arg	Gly	Val	Val	Gln	180	185	190	
Leu	Ser	Thr	Val	Ala	Gln	Thr	Arg	Gln	Gly	Thr	Leu	Arg	Glu	Gly	Tyr	195	200	205	
Ala	Ile	Ser	Pro	Tyr	Thr	Phe	Met	Asn	Ser	Val	Ala	Thr	Gln	Glu	Tyr	210	215	220	
Lys	Gly	Val	Ile	Arg	Leu	Gly	Thr	Gln	Ser	Glu	Ile	Asn	Ser	Asn	Leu	225	230	235	240
Gly	Asp	Val	Ala	Val	Thr	Gly	Glu	Thr	Leu	Asn	Gly	Arg	Gly	Ala	Thr	245	250	255	
Gly	Ser	Met	Arg	Gly	Val	Val	Lys	Leu	Thr	Thr	Gln	Ala	Gly	Ile	Ala	260	265	270	
Pro	Glu	Gly	Asp	Ser	Ser	Gly	Ala	Leu	Ala	Trp	Asn	Ala	Asp	Val	Ile	275	280	285	
Asn	Thr	Arg	Gly	Gly	Gln	Thr	Ile	Asn	Gly	Ser	Leu	Asn	Leu	Asp	His				

290	295	300
Leu Thr Ala Asn Gly Ile Trp Ser Arg Gly Gly Met Trp Lys Asn Gly 305 310 315 320		
Asp Gln Pro Val Ala Thr Glu Arg Tyr Ala Ser Glu Arg Val Pro Val 325 330 335		
Gly Thr Ile Met Met Phe Ala Gly Asp Ser Ala Pro Pro Gly Trp Ile 340 345 350		
Met Cys His Gly Gly Thr Val Ser Gly Asp Gln Tyr Pro Asp Tyr Arg 355 360 365		
Asn Thr Val Gly Thr Arg Phe Gly Gly Asp Trp Asn Asn Pro Gly Ile 370 375 380		
Pro Asp Met Arg Gly Leu Phe Val Arg Gly Ala Gly Thr Gly Gly His 385 390 395 400		
Ile Leu Asn Gln Arg Gly Gln Asp Gly Tyr Gly Lys Asp Arg Leu Gly 405 410 415		
Val Gly Cys Asp Gly Met His Val Gly Gly Val Gln Ala Gln Gln Ile 420 425 430		
Ser Tyr His Lys His Ala Gly Ala Trp Gly Glu Asn Gly Asn Asn Arg 435 440 445		
Gly Tyr Ala Pro Phe Gly Ala Ser Asn Gly Ser Gly Tyr Leu Gly Asn 450 455 460		
Gly Arg Ser Ala Asp Trp Asp Asn His Leu Phe Phe Thr Asn Asp Gly 465 470 475 480		
Phe Glu Met Gly Gly Pro Arg Asp Ser Phe Gly Thr Leu Asn Arg Glu 485 490 495		
Gly Leu Ile Gly Tyr Glu Thr Arg Pro Trp Asn Ile Ser Leu Asn Tyr 500 505 510		
Ile Ile Lys Ile His Tyr 515		

<210> 12
 <211> 516
 <212> PRT
 <213> protein p12 of RB69 phage

<400> 12

Met Ser Asn Asn Thr Tyr Gln His Val Ser Asn Glu Ser Val Tyr Val 1 5 10 15
Glu Phe Asp Pro Thr Gly Ser Asn Phe Asp Ser Ser Ile Thr Asn Val 20 25 30
Gln Ala Ala Leu Ala Ser Ile Ser Ala Tyr Gly Val Lys Gly Val Pro 35 40 45
Asp Ala Ser Glu Ala Glu Lys Gly Val Ile Gln Leu Ala Thr Glu Gln 50 55 60

Glu Val Leu Asp Gly Phe Asn Ser Thr Lys Ala Val Thr Pro Ala Thr	65	70	75	80
Leu Asn Ala Arg Leu Gln Tyr Pro Asn Ala Ser Glu Thr Gln Tyr Gly	85	90	95	
Val Thr Lys Tyr Ala Thr Gln Glu Glu Ala Ile Ala Gly Thr Leu Asp	100	105	110	
Thr Val Ser Ile Thr Pro Leu Lys Leu Asn Gln Thr Ile Asp Asn Thr	115	120	125	
Phe Ser Thr Arg Tyr Ser Thr Glu Thr Thr Asn Gly Val Ile Lys Ile	130	135	140	
Ala Thr Gln Thr Ala Ala Leu Ala Gly Ser Asp Asp Thr Thr Ala Met	145	150	155	160
Thr Pro Leu Lys Thr Gln Gln Leu Ala Ile Lys Leu Ile Ser Gln Ile	165	170	175	
Ala Pro Asn Asn Asp Pro Ala Ser Glu Ser Ile Thr Gly Val Val Arg	180	185	190	
Leu Ala Thr Val Ala Gln Thr Arg Gln Gly Thr Leu Arg Glu Gly Tyr	195	200	205	
Ala Ile Ser Pro Tyr Thr Phe Met Asn Ser Val Ala Thr Gln Glu Tyr	210	215	220	
Lys Gly Val Ile Arg Leu Gly Thr Gln Ala Glu Ile Asn Ser Asn Leu	225	230	235	240
Gly Asp Val Ala Val Thr Gly Glu Thr Leu Asn Gly Arg Gly Ala Thr	245	250	255	
Gly Ser Met Arg Gly Val Val Lys Leu Thr Thr Gln Ala Gly Val Ala	260	265	270	
Pro Glu Gly Asp Ser Ser Gly Ala Leu Ala Trp Asn Ala Asp Val Ile	275	280	285	
Asn Thr Arg Gly Gly Gln Thr Ile Asn Gly Ser Leu Asn Leu Asp His	290	295	300	
Leu Thr Ala Asn Gly Ile Trp Ser Arg Gly Gly Met Trp Lys Asn Gly	305	310	315	320
Asp Gln Pro Val Ala Thr Glu Arg Tyr Ala Ser Glu Arg Val Pro Val	325	330	335	
Gly Thr Ile Gln Met Phe Ala Gly Asp Ser Ala Pro Pro Gly Trp Val	340	345	350	
Leu Cys His Gly Gly Thr Ile Ser Gly Asp Gln Phe Pro Asp Tyr Arg	355	360	365	
Asn Val Val Gly Thr Arg Phe Gly Gly Asp Trp Asn Asn Pro Gly Ile	370	375	380	
Pro Asp Met Arg Gly Leu Phe Val Arg Gly Ala Gly Thr Gly Ser His	385	390	395	400
Ile Leu Asn Asn Arg Gly Gln Asp Gly Tyr Gly Lys Asp Arg Leu Gly				

405 410 415
 Val Gly Cys Asp Gly Met His Val Gly Gly Val Gln Ala Gln Gln Met
 420 425 430
 Ser Tyr His Lys His Ala Gly Gly Trp Gly Glu Phe Gln Arg His Glu
 435 440 445
 Ala Pro Phe Gly Ala Ser Val Tyr Gln Gly Tyr Leu Gly Thr Arg Lys
 450 455 460
 Tyr Ser Asp Trp Asp Asn Ala Ser Tyr Phe Thr Asn Asp Gly Phe Glu
 465 470 475 480
 Leu Gly Gly His Arg Asp Ala Thr Gly Thr Leu Asn Arg Glu Gly Leu
 485 490 495
 Ile Gly Tyr Glu Thr Arg Pro Trp Asn Ile Ser Leu Asn Tyr Ile Ile
 500 505 510
 Lys Val His Tyr
 515

<210> 13
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 <212> PRT
 <213> protein p12 of AR1 phage

<400> 13

Met Ser Asn Asn Thr Tyr Gln His Val Ser Asn Glu Ser Lys Tyr Val
 1 5 10 15
 Lys Phe Asp Pro Thr Gly Ser Asn Phe Pro Asp Thr Val Thr Thr Val
 20 25 30
 Gln Ser Ala Leu Ser Lys Ile Ser Asn Ile Gly Val Asn Gly Ile Pro
 35 40 45
 Asp Ala Thr Met Glu Val Lys Gly Ile Ala Met Ile Ala Ser Glu Gln
 50 55 60
 Glu Val Leu Asp Gly Thr Asn Asn Ser Lys Ile Val Thr Pro Ala Thr
 65 70 75 80
 Leu Ala Thr Arg Leu Leu Tyr Pro Asn Ala Thr Glu Thr Lys Tyr Gly
 85 90 95
 Leu Thr Arg Tyr Ser Thr Asn Glu Glu Thr Leu Glu Gly Ser Asp Asn
 100 105 110
 Asn Ser Ser Ile Thr Pro Gln Lys Leu Lys Tyr His Thr Asp Asp Val
 115 120 125
 Phe Gln Asn Arg Tyr Ser Ser Glu Ser Ser Asn Gly Val Ile Lys Ile
 130 135 140
 Ser Ser Thr Pro Ala Ala Leu Ala Gly Val Asp Asp Thr Thr Ala Met
 145 150 155 160
 Thr Pro Leu Lys Thr Gln Lys Leu Ala Ile Lys Leu Ile Ser Gln Ile
 165 170 175

Ala	Pro	Ser	Glu	Asp	Thr	Ala	Ser	Glu	Ser	Val	Arg	Gly	Val	Val	Gln	180	185	190
Leu	Ser	Thr	Val	Ala	Gln	Thr	Arg	Gln	Gly	Thr	Leu	Arg	Glu	Gly	Tyr	195	200	205
Ala	Ile	Ser	Pro	Tyr	Thr	Phe	Met	Asn	Ser	Val	Ala	Thr	Gln	Glu	Tyr	210	215	220
Lys	Gly	Val	Ile	Arg	Leu	Gly	Thr	Gln	Ser	Glu	Ile	Asn	Ser	Asn	Leu	225	230	235
Gly	Asp	Val	Ala	Val	Thr	Gly	Gly	Thr	Leu	Asn	Gly	Arg	Gly	Ala	Thr	245	250	255
Gly	Ser	Met	Arg	Gly	Val	Val	Lys	Leu	Thr	Thr	Gln	Ala	Gly	Ile	Ala	260	265	270
Pro	Glu	Gly	Asp	Ser	Ser	Gly	Ala	Leu	Ala	Trp	Asn	Ala	Asp	Val	Ile	275	280	285
Asn	Thr	Arg	Gly	Gly	Gln	Thr	Ile	Asn	Gly	Ser	Leu	Asn	Leu	Asp	His	290	295	300
Leu	Thr	Ala	Asn	Gly	Ile	Trp	Ser	Arg	Gly	Gly	Met	Trp	Lys	Asn	Gly	305	310	315
Asp	Gln	Pro	Val	Ala	Thr	Glu	Arg	Tyr	Ala	Ser	Glu	Arg	Val	Pro	Val	325	330	335
Gly	Thr	Ile	Met	Met	Phe	Ala	Gly	Asp	Ser	Ala	Pro	Pro	Gly	Trp	Ile	340	345	350
Met	Cys	His	Gly	Gly	Thr	Val	Ser	Gly	Asp	Gln	Tyr	Pro	Asp	Tyr	Arg	355	360	365
Asn	Thr	Val	Gly	Thr	Arg	Phe	Gly	Gly	Asp	Trp	Asn	Asn	Pro	Gly	Ile	370	375	380
Pro	Asp	Met	Arg	Gly	Leu	Phe	Val	Arg	Gly	Ala	Gly	Thr	Gly	Gly	His	385	390	395
Ile	Leu	Asn	Gln	Arg	Gly	Gln	Asp	Gly	Tyr	Gly	Lys	Asp	Arg	Leu	Gly	405	410	415
Val	Gly	Cys	Asp	Gly	Met	His	Val	Gly	Gly	Val	Gln	Ala	Gln	Gln	Met	420	425	430
Ser	Tyr	His	Lys	His	Ala	Gly	Gly	Trp	Gly	Glu	Tyr	Asn	Arg	Ser	Glu	435	440	445
Gly	Pro	Phe	Gly	Ala	Ser	Val	Tyr	Gln	Gly	Tyr	Leu	Gly	Thr	Arg	Lys	450	455	460
Tyr	Ser	Asp	Trp	Asp	Asn	Ala	Ser	Tyr	Phe	Thr	Asn	Asp	Gly	Phe	Glu	465	470	475
Leu	Gly	Gly	Pro	Arg	Asp	Ala	Leu	Gly	Thr	Leu	Asn	Arg	Glu	Gly	Leu	485	490	495
Ile	Gly	Tyr	Glu	Thr	Arg	Pro	Trp	Asn	Ile	Ser	Leu	Asn	Tyr	Ile	Ile	500	505	510
Lys	Ile	His	Tyr															

515

<210> 14
 <211> 527
 <212> PRT
 <213> protein p12 of K3 phage

<400> 14

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Met Ser Asn Asn Thr Tyr Gln His Val Ser Asn Glu Ser Arg Tyr Val
1          5          10          15

Lys Phe Asp Pro Thr Asp Thr Asn Phe Pro Pro Glu Ile Thr Asp Val
          20          25          30

Gln Ala Ala Ile Ala Ala Ile Ser Pro Ala Gly Val Asn Gly Val Pro
          35          40          45

Asp Ala Ser Ser Thr Thr Lys Gly Ile Leu Phe Leu Ala Thr Glu Gln
          50          55          60

Glu Val Ile Asp Gly Thr Asn Asn Thr Lys Ala Val Thr Pro Ala Thr
65          70          75          80

Leu Ala Thr Arg Leu Ser Tyr Pro Asn Ala Thr Glu Thr Val Tyr Gly
          85          90          95

Leu Thr Arg Tyr Ser Thr Asn Asp Glu Ala Ile Ala Gly Val Asn Asn
          100          105          110

Glu Ser Ser Ile Thr Pro Ala Lys Phe Thr Val Ala Leu Asn Asn Ala
          115          120          125

Phe Glu Thr Arg Val Ser Thr Glu Ser Ser Asn Gly Val Ile Lys Ile
          130          135          140

Ser Ser Leu Pro Gln Ala Leu Ala Gly Ala Asp Asp Thr Thr Ala Met
145          150          155          160

Thr Pro Leu Lys Thr Gln Gln Leu Ala Ile Lys Leu Ile Ala Gln Ile
          165          170          175

Ala Pro Ser Glu Thr Thr Ala Thr Glu Ser Asp Gln Gly Val Val Gln
          180          185          190

Leu Ala Thr Val Ala Gln Val Arg Gln Gly Thr Leu Arg Glu Gly Tyr
          195          200          205

Ala Ile Ser Pro Tyr Thr Phe Met Asn Ser Ser Ala Thr Glu Glu Tyr
          210          215          220

Lys Gly Val Ile Lys Leu Gly Thr Gln Ser Glu Val Asn Ser Asn Asn
225          230          235          240

Ala Ser Val Ala Val Thr Gly Ala Thr Leu Asn Gly Arg Gly Ser Thr
          245          250          255

Thr Ser Met Arg Gly Val Val Arg Leu Thr Thr Thr Ala Gly Ser Gln
          260          265          270

Ser Gly Gly Asp Ala Ser Ser Ala Leu Ala Trp Asn Ala Asp Val Ile
          275          280          285

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His Gln Arg Gly Gly Gln Thr Ile Asn Gly Thr Leu Arg Ile Asn Asn
 290 295 300
 Thr Leu Thr Ile Ala Ser Gly Gly Ala Asn Ile Thr Gly Thr Val Asn
 305 310 315 320
 Met Thr Gly Gly Tyr Ile Gln Gly Lys Arg Val Val Thr Gln Asn Glu
 325 330 335
 Ile Asp Arg Thr Ile Pro Val Gly Ala Ile Met Met Trp Ala Ala Asp
 340 345 350
 Ser Leu Pro Ser Asp Ala Trp Arg Phe Cys His Gly Gly Thr Val Ser
 355 360 365
 Ala Ser Asp Cys Pro Leu Tyr Ala Ser Arg Ile Gly Thr Arg Tyr Gly
 370 375 380
 Gly Ser Ser Ser Asn Pro Gly Leu Pro Asp Met Arg Gly Leu Phe Val
 385 390 395 400
 Arg Gly Ser Gly Arg Gly Ser His Leu Thr Asn Pro Asn Val Asn Gly
 405 410 415
 Asn Asp Gln Phe Gly Lys Pro Arg Leu Gly Val Gly Cys Thr Gly Gly
 420 425 430
 Tyr Val Gly Glu Val Gln Lys Gln Gln Met Ser Tyr His Lys His Ala
 435 440 445
 Gly Gly Phe Gly Glu Trp Asp Asp Ser Gly Ala Phe Gly Asn Thr Arg
 450 455 460
 Arg Ser Asn Phe Val Gly Thr Arg Lys Gly Leu Asp Trp Asp Asn Arg
 465 470 475 480
 Ser Tyr Phe Thr Asn Asp Gly Tyr Glu Ile Asp Pro Ala Ser Gln Arg
 485 490 495
 Asn Ser Arg Tyr Thr Leu Asn Arg Pro Glu Leu Ile Gly Asn Glu Thr
 500 505 510
 Arg Pro Trp Asn Ile Ser Leu Asn Tyr Ile Ile Lys Val Lys Glu
 515 520 525

<210> 15

<211> 516

<212> PRT

<213> protein p12 of RB32-33 phage

<400> 15

Met Ser Asn Asn Thr Tyr Gln His Val Ser Asn Glu Ser Lys Tyr Val
 1 5 10 15
 Lys Phe Asp Pro Val Gly Ser Asn Phe Pro Asp Thr Val Thr Thr Val
 20 25 30
 Gln Ser Ala Leu Ser Lys Ile Ser Asn Ile Gly Val Asn Gly Ile Pro
 35 40 45
 Asp Ala Thr Met Glu Val Lys Gly Ile Ala Met Ile Ala Ser Glu Gln
 50 55 60

Glu	Val	Leu	Asp	Gly	Thr	Asn	Asn	Ser	Lys	Ile	Val	Thr	Pro	Ala	Thr	65	70	75	80
Leu	Ala	Thr	Arg	Leu	Leu	Tyr	Pro	Asn	Ala	Thr	Glu	Thr	Lys	Tyr	Gly	85	90	95	
Leu	Thr	Arg	Tyr	Ser	Thr	Asn	Glu	Glu	Thr	Leu	Glu	Gly	Ser	Asp	Asn	100	105	110	
Asn	Ser	Ser	Ile	Thr	Pro	Gln	Lys	Leu	Lys	Tyr	His	Thr	Asp	Asp	Val	115	120	125	
Phe	Gln	Asn	Arg	Tyr	Ser	Ser	Glu	Ser	Ser	Asn	Gly	Val	Ile	Lys	Ile	130	135	140	
Ser	Ser	Thr	Pro	Ala	Ala	Leu	Ala	Gly	Val	Asp	Asp	Thr	Thr	Ala	Met	145	150	155	160
Thr	Pro	Leu	Lys	Thr	Gln	Lys	Leu	Ala	Ile	Lys	Leu	Ile	Ser	Gln	Ile	165	170	175	
Ala	Pro	Ser	Glu	Asp	Thr	Ala	Ser	Glu	Ser	Val	Arg	Gly	Val	Val	Gln	180	185	190	
Leu	Ser	Thr	Val	Ala	Gln	Thr	Arg	Gln	Gly	Thr	Leu	Arg	Glu	Gly	Tyr	195	200	205	
Ala	Ile	Ser	Pro	Tyr	Thr	Phe	Met	Asn	Ser	Val	Ala	Thr	Gln	Glu	Tyr	210	215	220	
Lys	Gly	Val	Ile	Arg	Leu	Gly	Thr	Gln	Ser	Glu	Ile	Asn	Ser	Asn	Leu	225	230	235	240
Gly	Asp	Val	Ala	Val	Thr	Gly	Glu	Thr	Leu	Asn	Gly	Arg	Gly	Ala	Thr	245	250	255	
Ser	Ser	Met	Arg	Gly	Val	Val	Lys	Leu	Thr	Thr	Gln	Ala	Gly	Ile	Ala	260	265	270	
Pro	Glu	Gly	Asp	Gly	Ser	Gly	Ala	Leu	Ala	Trp	Asn	Ala	Asp	Val	Ile	275	280	285	
Asn	Thr	Arg	Gly	Gly	Gln	Thr	Ile	Asn	Gly	Ser	Leu	Asn	Leu	Asp	His	290	295	300	
Leu	Thr	Ala	Asn	Gly	Ile	Trp	Ser	Arg	Gly	Gly	Met	Trp	Lys	Asn	Gly	305	310	315	320
Asp	Gln	Pro	Val	Ala	Thr	Glu	Arg	Tyr	Ala	Ser	Glu	Arg	Val	Pro	Val	325	330	335	
Gly	Thr	Ile	Met	Met	Phe	Ala	Gly	Asp	Ser	Ala	Pro	Pro	Gly	Trp	Ile	340	345	350	
Met	Cys	His	Gly	Gly	Thr	Val	Ser	Gly	Asp	Gln	Tyr	Pro	Asp	Tyr	Arg	355	360	365	
Asn	Thr	Val	Gly	Ala	Arg	Phe	Gly	Gly	Asp	Trp	Asn	Asn	Pro	Gly	Ile	370	375	380	
Pro	Asp	Met	Arg	Gly	Leu	Phe	Val	Arg	Gly	Ala	Gly	Thr	Gly	Gly	His	385	390	395	400

Ile	Leu	Asn	Gln	Arg	Gly	Gln	Asp	Gly	Tyr	Gly	Lys	Asp	Arg	Leu	Gly	405	410	415
Val	Gly	Cys	Asp	Gly	Met	His	Val	Gly	Gly	Val	Gln	Ala	Gln	Gln	Met	420	425	430
Ser	Tyr	His	Lys	His	Ala	Gly	Gly	Trp	Gly	Glu	Tyr	Gln	Arg	His	Glu	435	440	445
Ala	Pro	Phe	Gly	Ala	Ser	Val	Tyr	Gln	Gly	Tyr	Leu	Gly	Thr	Arg	Lys	450	455	460
Tyr	Ser	Asp	Trp	Asp	Asn	Ala	Ser	Tyr	Phe	Thr	Asn	Asp	Gly	Phe	Glu	465	470	475
Leu	Gly	Gly	Pro	Arg	Asp	Ala	Leu	Gly	Thr	Leu	Asn	Arg	Glu	Gly	Leu	485	490	495
Ile	Gly	Tyr	Glu	Thr	Arg	Pro	Trp	Asn	Ile	Ser	Leu	Asn	Tyr	Ile	Ile	500	505	510
Lys	Ile	His	Tyr													515		